

PreCalculus Review Sheet for Exam 2 02 Key

$$\textcircled{1} \begin{array}{r|rrrr} \frac{5}{3} & 6 & -7 & -5 & \\ & 10 & 5 & & \\ \hline & 6 & 3 & 0 & \end{array}$$

$$2x+1 + \frac{0}{3x-5}$$

$$\textcircled{6} \begin{array}{r|rrrr} \frac{1}{2} & 2 & 13 & -8 & \\ & & 1 & 7 & \\ \hline & 2 & 14 & -1 & \end{array}$$

$$2x+14 - \frac{1}{(x-\frac{1}{2})}$$

$$\textcircled{c} \begin{array}{r|rrrrrrr} -2 & 5 & 0 & 3 & 0 & 0 & 1 & \\ & -10 & 20 & -46 & 92 & -184 & & \\ \hline & 5 & -10 & 23 & -46 & 92 & -183 & \end{array}$$

$$5x^4 - 10x^3 + 23x^2 - 46x + 92 - \frac{183}{x+2}$$

$$\textcircled{d} \begin{array}{r|rrrr} 3 & 7 & -23 & 6 & \\ & 21 & -6 & & \\ \hline & 7 & -2 & 0 & \end{array}$$

$$7x-2$$

$$\textcircled{e} \begin{array}{r|rrrrrr} -3 & 1 & 0 & 0 & -5 & 10 & \\ & -3 & 9 & -27 & 96 & & \\ \hline & 1 & -3 & 9 & -32 & 106 & \end{array}$$

$$x^3 - 3x^2 + 9x - 32 + \frac{106}{x+3}$$

$$\textcircled{f} \begin{array}{r} 3x-8 \\ x^2+2x \overline{) 3x^3-2x^2+4x+7} \\ \underline{-3x^3+6x^2} \\ -8x^2+4x+7 \\ \underline{+8x^2+16x} \\ 20x+7 \end{array}$$

$$3x-8 + \frac{20x+7}{x^2+2x}$$

$$\textcircled{g} \begin{array}{r} x^2-3x-2 \\ x^2+2 \overline{) x^4-3x^3+0x^2+6x-18} \\ \underline{-x^4+2x^2} \\ -3x^3-2x^2+6x-18 \\ \underline{+3x^3+6x} \\ -2x^2+12x-18 \\ \underline{+2x^2+4x} \\ 12x-14 \end{array}$$

$$x^2-3x-2 + \frac{12x-14}{x^2+2}$$

$$12x-14$$

$$\begin{array}{r} 2 \mid 1 \quad -3 \quad -10 \quad 24 \\ \underline{2 \quad -2 \quad -24} \\ 1 \quad -1 \quad -12 \quad 0 \end{array}$$

$$(x-2)(x^2-x-12)$$

$$(x-2)(x-4)(x+3)$$

other factors

therefore
 $x-2$ is
a factor

$$\begin{aligned} (3) \quad P(x) &= 3x^{107} + 14x^{35} - 16x \\ P(1) &= 3(1)^{107} + 14(1)^{35} - 16(1) \\ &= 3 + 14 - 16 \\ &= 1 \end{aligned}$$

$$\begin{aligned} (4) \quad P(x) &= 14x^{10} - 2x^3 - 17 \\ P(-2) &= 14(-2)^{10} - 2(-2)^3 - 17 \\ &= 14335 \end{aligned}$$

$$\begin{aligned} (5) \quad f(-3) &= (-3)^3 + (-3)^2 - 5(-3) + 3 \\ f(-3) &= 0 \\ \therefore x+3 &\text{ is a factor of } f(x) \end{aligned}$$

$$\begin{aligned} (6) \quad f(-1) &= (-1)^3 - 13(-1)^2 + 23(-1) - 11 \\ &= -1 - 13 - 23 - 11 \neq 0 \end{aligned}$$

$\therefore x+1$ is not a factor of $f(x)$

$$(8) \quad -16 = x^4$$

$$(9) \quad 3/2 = x$$

$$(10) \quad x = 3, \frac{1}{2}, -3$$

$$(11) \quad x-8 \quad (12) \quad 2x-3$$

$$(7) (a) \quad \frac{\pm 1}{\pm 1, \pm 3} = \pm 1, \pm \frac{1}{3}$$

$$(b) \quad \frac{\pm 1, \pm 2, \pm 4, \pm 8, \pm 16, \pm 32, \pm 64}{\pm 1} = \pm 1, \pm 2, \pm 4, \pm 8, \pm 16, \pm 32, \pm 64$$

$$(c) \quad \frac{\pm 1, \pm 2, \pm 4, \pm 8}{\pm 1, \pm 3} = \pm 1, \pm 2, \pm 4, \pm 8, \pm \frac{1}{3}, \pm \frac{2}{3}, \pm \frac{4}{3}, \pm \frac{8}{3}$$

$$(d) \quad \frac{\pm 1, \pm 5, \pm 25}{\pm 1, \pm 2, \pm 4, \pm 8} = \pm 1, \pm 5, \pm 25, \pm \frac{1}{2}, \pm \frac{5}{2}, \pm \frac{25}{2}, \pm \frac{1}{4}, \pm \frac{5}{4}, \pm \frac{25}{4}, \pm \frac{1}{8}, \pm \frac{5}{8}, \pm \frac{25}{8}$$

⑬ (a) $f(-x) = -3(-x)^2 + 4 = -3x^2 + 4$ EVEN

(b) $f(-x) = 2(-x)^3 - 4(-x) = -2x^3 + 4x$ ODD

(c) $f(-x) = \frac{-x}{(-x)^2 - 1} = \frac{-x}{x^2 - 1} = -1 \cdot \frac{x}{x^2 - 1}$ ODD

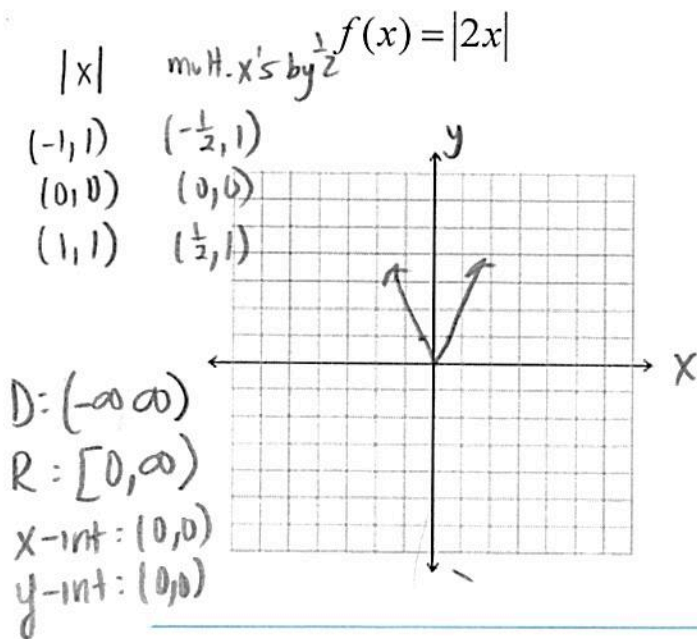
(d) $f(x) = x^2 - 4x + 4 + 1 = x^2 - 4x + 5$

$f(-x) = (-x)^2 - 4(-x) + 5 = x^2 + 4x + 5$ NEITHER

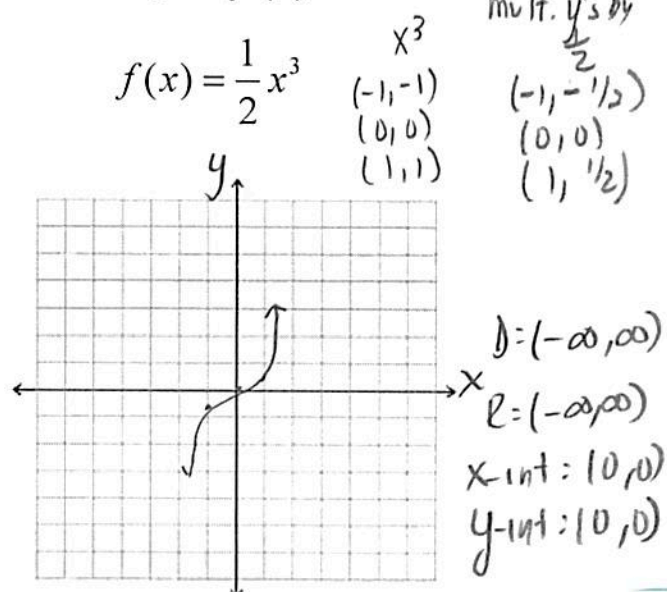
⑭ (a) $g(x) = \sqrt[3]{x+2} - 4$

(b) $h(x) = \left(-\frac{1}{2}x\right)^3$

⑮ a. Original $f(x) = |x|$



b. Original $f(x) = x^3$



(16) (a)
$$\begin{array}{r|rrrrrr} 7 & 5 & -46 & 84 & -50 & 7 \\ & & 35 & -77 & 49 & -7 \\ \hline 11 & 5 & -11 & 7 & -1 & 0 \\ & & 5 & -6 & +1 & \\ \hline & 5 & -6 & 1 & 0 & \end{array}$$

$$\left\{ \frac{1}{5}, 7, 1 \text{ (double zero)} \right\}$$

$$5x^2 - 6x + 1 = 0$$

$$5x^2 - 5x - x + 1 = 0$$

$$5x(x-1) - 1(x-1) = 0$$

$$(5x-1)(x-1) = 0$$

$$x = \frac{1}{5} \quad x = 1$$

(b)
$$\begin{array}{r|rrrr} -\frac{3}{2} & 2 & 9 & 19 & 15 \\ & & -3 & -9 & -15 \\ \hline & 2 & 6 & 10 & 0 \end{array}$$

$$\left\{ -\frac{3}{2}, \frac{-3 \pm i\sqrt{11}}{2} \right\}$$

$$(x^2 + 3x + 5)(2x + 3) = 0$$

$$x = \frac{-3 \pm \sqrt{3^2 - 4(1)(5)}}{2(1)} = \frac{-3 \pm \sqrt{-11}}{2} = \frac{-3 \pm i\sqrt{11}}{2}$$

(17) (a)
$$\begin{array}{r|rrrr} -1 & 3 & 11 & 5 & -3 \\ & & -3 & -8 & 3 \\ \hline & 3 & 8 & -3 & 0 \end{array}$$

$$\begin{aligned} & (x+1)(3x(x+3) - 1(x+3)) \\ & (x+1)(3x-1)(x+3) \end{aligned}$$

$$(x+1)(3x^2 + 8x - 3)$$

$$(x+1)(3x^2 + 9x - x - 3)$$

(17) (b)

$$\begin{array}{r|rrrrrr} -11 & -3 & -10 & -24 & -6 & 5 \\ & & -3 & 13 & 11 & -5 \\ \hline -11 & 3 & -13 & -11 & 5 & 0 \\ & & -3 & 16 & -5 & \\ \hline & 3 & -16 & 5 & 0 & \end{array}$$

$$(x+1)^2 (3x^2 - 16x + 5)$$

$$(x+1)^2 (3x^2 - 15x - x + 5)$$

$$(x+1)^2 (3x(x-5) - 1(x-5))$$

$$(x+1)^2 (3x-1)(x-5)$$